

October 2021

Environmental Management
Disposal Facility

Waste Acceptance Criteria



U.S. DEPARTMENT OF
ENERGY

The ability to dispose of cleanup waste onsite has been fundamental to the success of the U.S. Department of Energy's (DOE) environmental management mission on the Oak Ridge Reservation (ORR). With the current disposal facility nearing capacity and significant cleanup remaining, the need for a new onsite facility is imminent.

The new facility, known as the Environmental Management Disposal Facility (EMDF), allows DOE to maintain its cleanup momentum in Oak Ridge, enhancing safety and enabling science and national security missions. DOE has worked collaboratively with the U.S. Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC) on a science-driven approach that ensures a safe and protective design for the proposed engineered disposal facility.



Construct a critically needed onsite disposal facility for environmental cleanup waste that is protective of human health and the environment.

Commented [LE1]: Although this is the topic, the general public will not be familiar with the term EMDF. Suggest using "landfill" as that is much easier to understand. Landfill for cleanup waste is also easy to understand.

Commented [LE2]: This title does not mean anything to the average person. Suggest using "Oak Ridge Landfill and Proposed Criteria for Acceptable Waste"

Commented [LE3]: I'm not sure this goal needs to be called out here. What does the mean to the general public?

Waste Acceptance Criteria

Waste Acceptance Criteria (WAC) are the requirements (i.e., federal and state laws) that determine which wastes contaminants and how much (i.e., quantity) of these waste/contaminants can be disposed at EMDF. DOE, EPA, and TDEC have worked extensively to determine appropriate and protective limits for the facility's WAC so residents can know they are safe and protected from the cleanup waste – now and in the future.

What does the WAC do?

1. Sets limits on the type and amount of waste based on:



Environmental laws



The EMDF facility design



Geologic conditions of the EMDF site

2. Sets how waste is evaluated and disposal methods.

Commented [LE4]: Suggest using this call out box to have clear titles that are easy to understand. Second option is to restructure the current titles.

- Why is DOE proposing a new landfill (EMDF)?

Need to safely dispose of remediation waste at Oak Ridge...

- Why are waste acceptance criteria needed for waste sent to the landfill?

Waste acceptance criteria are needed to ensure that any waste sent to the landfill can be safely disposed for perpetuity.

- Why is this important?

It's important for the public to be aware of things that might affect their environment. You can be involved in the decision-making process. If you would like to provide feedback, please do so by...

Path Forward/Next Steps

The final WAC have not been determined, but there is agreement on much of the criteria. DOE, EPA, and TDEC will continue to work together to determine the final requirements for EMDF that support ORR's environmental cleanup and are protective of human health and the environment.

What is allowed in EMDF? What is prohibited from disposal in EMDF?



EMDF will accept much of the same types of waste as the current onsite facility, which has operated safely for 20 years.

The waste will be comprised of demolition debris and soils from cleanup at the Y-12 National Security Complex and Oak Ridge National Laboratory. Demolition debris will comprise approximately 55% of the capacity with soils accounting for the remaining 45%.

DOE is committed to continue shipping all highly radioactive waste out of the state for permanent disposal.



Prohibited or Limited Waste for EMDF

Waste must be generated from Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related cleanup on DOE's Oak Ridge Reservation.

Transuranic waste, high-level waste, spent nuclear fuel, wastes produced by the extraction or concentration of uranium, and waste greater than Nuclear Regulatory Commission Class C are prohibited.

Resource Conservation and Recovery Act (RCRA) listed hazardous wastes are prohibited.

Infectious/pathogenic wastes and pyrophoric/detonatable/explosive wastes are prohibited.

Containerized compactible waste must have voids filled with soil/grout or be capable of being crushed by available landfill operations equipment. Non-crushable containers (such as 8-25 boxes) must have remaining voids filled with non-compressible material.

Free liquids are prohibited; RCRA and Toxic Substances Control Act waste packages cannot have free liquids.

Bulk liquids exceeding 500 parts per million (ppm) polychlorinated biphenyls (PCB) are prohibited. Bulk liquids containing PCBs at or below 500 ppm must be treated so it no longer contains free liquids.

PCB containers with PCB liquids between 50 ppm and 500 ppm are allowed with additional sorbent material included.

Bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids (whether or not sorbents are added) are prohibited.

Unless very small, containers must be either at least 90% full or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill.

Waste must not contain or be capable of generating quantities of toxic fumes or gases harmful to persons transporting, handling, or disposing the waste.

RCRA hazardous waste that does not meet land disposal restriction treatment requirements or alternative treatment standards for hazardous debris or soil are prohibited.

RCRA mercury characteristic hazardous waste is prohibited from disposal.

Waste shall be limited to prevent nuclear criticality during all phases of waste cell operation, including active disposal operations and inactive, post-closure periods.

Commented [LE5]: Move this title below the photo. Could also use a color text box to further separate this from the list of prohibited materials on the right.

Commented [LE6]: Seems like this should be in the "allowed waste" column or rephrase to say "waste generated outside of CERCLA-related cleanup at ORR"

Commented [LE7]: Can delete "are prohibited" throughout this list based on the title

Commented [LE8]: Does this mean "Waste with void space" and put this other information after?

Commented [LE9]: How can this be phrased to be more like the other items listed?

[SHAPE * MERGEFORMAT]

Analytic WAC are limits for radionuclides are important because they ensure the protectiveness of the facility once it is at full capacity and closed. DOE achieves protectiveness by implementing requirements that limit various radionuclides to specific thresholds to manage future risk that keep risks minimal.

The numerical limits are applied in two ways: (1) to individual 'waste lots' as they are proposed for disposal and (2) to the total facility, as it is filled through its lifecycle.

A waste lot is the primary unit of waste used to determine WAC compliance for a cleanup project proposing waste for disposal in the EMDF. It is developed based on the waste characteristics such as material type and contaminants and also considers the associated mass and volume of the waste.

EMDF Waste Lot Concentration Limits:

These limits are applied to the waste lots, not the landfill as a whole. These concentration limits derive from an analysis of a maximally exposed individual through inadvertent means. These limits protect human health in the case of future hypothetical inadvertent intrusion into the disposal facility. The scenario involves a person drilling a well through the EMDF cover system and into the waste and then filling the excavated waste into a garden near the disposal facility. Due to the thickness of the cap, there is no direct exposure to the waste under any evaluated future residential scenario, including constructing a basement.

The full table and listing is available in the Draft Record of Decision available at: <https://doeic.science.energy.gov/uploads/F.0615.031.0206.pdf>.

Requirements limit various radionuclides to specific thresholds that keep risks minimal.

EMDF Landfill Inventory Limits:

These limits are applied to the landfill as a whole. Another performance assessment analysis included a scenario where the maximally exposed individual is drinking contaminated groundwater and eating fish impacted by a release from EMDF. This analysis results in the determination of Landfill Inventory Limits to maintain protection of the public and environment after the facility is closed.

The performance assessment analysis evaluated exposures up to 1,000 years after closure, which indicated Landfill Inventory Limits for three radionuclides (Carbon-14, Hydrogen-3, Technetium-99 in table right) are needed to ensure protectiveness during this time frame. These are considered 'Tier 1' radionuclides.

Radioisotope	Landfill Inventory Limit (Ci)*
Carbon-14	47.3
Hydrogen-3	3.31E+13
Technetium-99	1070

DOE conducted an additional analysis for the 1,000-year to 10,000-year timeframe to determine if any less mobile radionuclides should be considered or require Landfill Inventory Limits. Only one additional isotope, beyond the three identified, presents a risk during this extended time period based on the projected inventory to be disposed of in the landfill.

Commented [LE10]: This figure by itself could be misleading. Should also include the graphic that shows the majority of waste is not radioactive and will be disposed of at the new landfill. A statement saying rads are sent offsite as required by environmental regulations could help.

Commented [LE11]: This section is still too technical. See suggestions on how to make it more understandable to the average person.

Commented [LE12]: Could the call out box below be replaced with a simple graphic that shows how waste lot concentrations apply to smaller units while inventory limits apply to the whole.

Commented [LE13]: Which isotope? Why mention it if the isotope is not listed.

What is a WAC Compliance Plan?

DOE will develop a WAC Compliance Plan to explain the basis for WAC use and describe implementation. DOE will also complete an analysis for the landfill inventory throughout operations and at closure, limiting the overall radionuclide inventory that can be placed in the EMDF.

The WAC Compliance Plan will specify how these analyses are completed. DOE will also develop and include details regarding implementation of the WAC, roles and responsibilities of the waste generator versus the disposal facility, and how multiple isotopes in a single waste lot are summed and how landfill inventory limits will be tracked.



Commented [LE14]: Will EPA and TDEC need to review and approve the compliance plan? If so, a sentence should be added which states "DOE will work with EPA and TDEC for regulatory approval of the compliance plan."

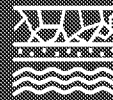
WAC set limits
on the type
and amount
of waste
based on:



Environmental
laws



EMDF facility
design



Geologic conditions
of the site

[SHAPE * MERGEFORMAT]

Commented [LE15]: Should add 1-2 sentences on how public comment is considered in the final cleanup decision and how a responsiveness summary will be written to identify how public comment affected the decision.